9. The process according to claim 7 comprising a skull melting process using a water-cooled copper crucible.

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REMARKS

Reconsideration and withdrawal of the rejections in the Office Action are respectfully requested in view of the following remarks.

Summary of Amendment

The specification is amended to conform with U.S. practice. No new matter is added.

New claims are added to claim additional subject matter of the invention. The support of these new claims can be found on page 6, lines 1-10, of the specification. Therefore, no new matter is added.

Applicants note that the added new claims are process claims. Upon allowance of the product claims, Applicants respectfully request that these process claims, since they are process of making the patentable claimed product, be rejoined to the product claims.

Summary of Office Action

(1) Claims 1-6 are rejected under 35 U.S.C. § 103(a) as being unpatentable over EP 597,129 ("FUJISAWA").

The Office Action alleges that FUJISAWA teaches substantially all the recitations of the claimed invention except that it does not disclose "Cr exceeding 60 wt.%." Instead,

FUJISAWA teaches an alloy with Cr up to 60%. The Office Action concludes however that the claimed composition of Cr would have been obvious because FUJISAWA's up to 60 wt% is close enough to the claimed exceeding 60 wt% that it would be expected to have the same properties.

(2) Claims 1-6 are also rejected under 35 U.S.C. §103(a) as being unpatentable over JP 07-278718 ("SHIDA") in view of JP 08-225899 ("ABIKO").

The Office Action alleges that SHIDA teaches an alloy with at least 70% Cr with reduced N and O impurities. However, the Office Action admits that SHIDA does not disclose C+N to be less than 20 ppm, S to be less than 20 ppm, O to be less than 100 ppm, and O as oxides to be less than 50 ppm. The Office Action then cites a secondary document, ABIKO, and alleges that ABIKO teaches a method of making an alloy that produces low amounts of impurities and has examples of alloy with C, N, S, and O in total amounts of 9.1 ppm, 15.0 ppm and 18.5 ppm. Therefore, the Office Action concludes that it would have been obvious to apply ABIKO's amounts in SHIDA's alloy because the reduced Cgi (defined as total quantity of C, N, S, and O) improves the workability of the alloy.

Response to Rejections

With respect to the rejection of claims 1-6 as being obvious over FUJISAWA, Applicants respectfully submit that the motivation to change FUJISAWA's Cr content to exceed 60wt% is not disclosed or suggested in FUJISAWA. In fact, FUJISAWA's

invention clearly and expressly teaches away from a composition "exceeding 60 wt.%." On page 16, line 1, FUJISAWA states that "addition of the Cr in excess of 60% by weight is undesirable in view of an increased cost." Also, on Page 10, lines 45-48, FUJISAWA states that "Cr content in excess of 60% by weight will result in an insufficient workability even when the content of C, N, O, P and S is reduced." On page 11, lines 21-24, FUJISAWA states that "the alloy having the Cr content within such a range (5-60%) would exhibit a sufficient acid resistance. Addition of an excessive amount of the Cr would result in poor workability. In addition, such an excessive addition of the Cr would not contribute to further improvement in the acid resistance." Similar statements with regard to "sufficient oxidation resistance" is also provided on page 12, lines 26-30.

On the contrary, the presently claimed invention provides an alloy with an excellent strength-ductility balance at higher temperature. Based on Table 2 of the present specification, when Cr exceeds 60 wt.%, there are substantial increases in the alloy's TS and RaxTS values, especially at higher temperatures. In FUJISAWA, however, excellent workability and strength at high-temperature is achieved by having Cr at 3 to 60% by weight and no more than 100 ppm in total content of C, N, O, P and S and only with at least one other element selected from Ti, Nb, Zr, V, Ta, W and B (See claim 5 of FUJISAWA).

Therefore, one of ordinary skill in the art will not be motivated to arrive at a Cr level of exceeding 60 wt% using FUJISAWA's alloy and the rejection based on FUJISAWA is improper and should be withdrawn.

Moreover, FUJISAWA's invention is a technique relating to "Fe-Cr alloy excellent in workability." FUJISAWA describes (A) an Fe-Cr alloy excellent in workability in Category A, and an Fe-Cr alloy excellent both in workability and strength at a high temperature in Category (B).

However, the above workability in inventions of Category A and B is workability at room temperature, which is different from workability at high temperature. The difference is even more prominent with regard to claims 3 and 4 which defines high temperature as not less than 1000 °C. Moreover, the above strength at a high temperature in the invention of Category B is, as apparent from test temperature, 900°C, of proof stress at high temperature described in the Examples, is not that at not less than 1000°C as a target of the present invention. That is, FUJISAWA's invention does not disclose strength-ductility balance at high temperature, much less at 1000°C.

Moreover, in the inventions of Category A and B the addition of 60%-exceeding Cr is excluded and, if anything, FUJISAWA expressly teaches away from such addition, as described above. For example, FUJISAWA, at page 10, lines 45-48, describes that: "Furthermore, the Fe-Cr alloy of the present invention has a Cr content of from 3 to 60% by weight, and preferably, from 5 to 30% by weight. The Cr content of less than 3% by weight will result in a poor corrosion resistance, while the Cr content in excess of 60% by weight will result in an insufficient workability even when the content of C, N, O, P and S is reduced." Similar comments are described in page 11, lines 21-24, page 12, lines 26-30

and page 17, lines 11-14.

Furthermore, in the invention of Category B, as apparent from claim 5 of FUJISAWA, the property of strength at a high temperature can be attained by a Cr content of 3-60% by weight and not more than 100 ppm of C, N, O, P and S in total, and by adding at least one alloy element selected from Ti, Nb, Zr, V, Ta, W and B. This emphasized that FUJISAWA's invention is entirely different from the present invention for obtaining strength at a high temperature and workability by adding Cr in excess of 60% and highly purifying it in terms of even its technical approach.

Therefore, FUJISAWA's invention and the present invention are not only different in component composition as well as approach. Thus, it is impossible to gather the strength-ductility balance characteristic excellent in a high temperature environment, especially ultra-high temperature zone such as 1000 °C possessed by a Fe-Cr alloy according to the present invention from the description of FUJISAWA's invention.

With respect to rejection of claims 1-6 over SHIDA in view of ABIKO, Applicants respectfully submit that the combination of these two documents is improper.

Regarding SHIDA, as the Office Action correctly recognizes, SHIDA teaches an alloy that contains more than 60% by weight of Cr. But the other elements of the alloy are much much higher than what are claimed in the present invention. For instance, SHIDA's alloy could contain more than 1000 ppm of N and more than 900 ppm of O. On the contrary, the present claims require C+N of not more than 20 ppm. The difference is due

to the different purposes of the two products. While SHIDA teaches an alloy to be cast into a product, the present invention provides an alloy which can be plastically worked after casting and made into a product. Moreover, there is no disclosure or suggestion that excellent strength at a high temperature is achieved by decreasing C, N, S, and O to an extremely small amount as compared to the amounts used in the alloy of SHIDA.

Regarding ABIKO, it teaches the use of smaller amounts of C, N, S, and O and the Cr amount of less than 60%. Its alloy has excellent plastic deformability in temperature range of recrystallization temperature or below. However, ABIKO expressly teaches away the use of Cr to more than 60%. In Paragraph 0018, ABIKO states that "the effect is saturated and becomes disadvantageous economically, even if it adds exceeding 60 wt %, although it is necessary to add 15 wt% Cr at least in order to maintain the oxidation resistance as high temperature material."

As the Examiner is well aware, in order to combine two prior documents to reach all recitations of the claimed invention, there must be some suggestion or motivation for such combination. This is particularly important in this application since an alloy, by its definition, is a combination of various elements. As one courts recently stated:

> "Virtually all inventions are combinations of old elements. Therefore, an examiner may often find every element of a claimed invention in the prior art. If identification of each claimed element in the prior art were sufficient to negate patentability, very few patents would ever issue. Furthermore, rejecting patents solely by finding prior art corollaries for the claimed elements would permit an examiner to use the claimed invention itself as a blueprint for piecing

> together elements in the prior art to defeat the patentability of the claimed invention." *In re Rouffet*, 47 USPQ2d 1453, 1457 (Fed Cir 1998).

In this application, Applicants respectfully submit that one of ordinary skill in the art would not be motivated to either 1) reduce the amounts of C, N, S, and O in SHIDA to levels of in ABIKO's product because reducing in such a large amount would produce a product completely different from the teachings of SHIDA, 2) increase the amount of Cr in ABIKO to levels of SHIDA because ABIKO expressly teaches away from such increase. Therefore, the combination of the two documents is improper and the rejection which based on such combination should be withdrawn.

Furthermore, with respect to ABIKO and SHIDA, Applicants respectfully point out the following:

Regarding ABIKO, this document relates to a metal having excellent plastic deformability in a temperature range of recrystallization temperature or below. It discloses an alloy containing Cr: 15-60 wt% and not more than 50 ppm of solid-solute gas component (C, N, S, O) in total amount.

However, ABIKO's invention excludes addition of Cr in excess of 60% as described "even if adding Cr by exceeding 60 wt%, its effect is saturated" (see paragraph 0018). Further, the addition amount of Cr described in Example is 50% at most. Therefore, ABIKO never discloses the construction of the invention, wherein C, N, S, O are decreased

to an extremely small amount and not less than 60% of Cr is further added.

Moreover, the temperature range of recrystallization temperature, or below, in ABIKO, although not expressly described, can be assumed as 800-900 °C from measuring temperature of strength at a high temperature in the Example. Furthermore, the strength at a high temperature of 900 °C is 40 Mpa at most, which is apparently inferior to the high temperature characteristic (less than 195 Mpa) of the present invention in comparison. Thus, ABIKO never discloses excellent strength and workability at super-high temperature such as 1000 °C in the present invention.

SHIDA's invention discloses an alloy where not less than 60% or Cr, but contains a large quantity of N and O. And, the obtained alloy is used as it is cast without requiring any workability. Hence, there is not disclosed nor suggested that any excellent strength at a high temperature is obtained by decreasing C, N, S and O to an extremely small amount.

Moreover, ABIKO's invention discloses decrease of C, N, S and O, but excludes addition of Cr in excess of 60%. Furthermore, ABIKO's invention aims at characteristic improvement of the temperature range of recrystallization temperature or below, but never refers to strength at elevated temperature of not less than 1000 °C.

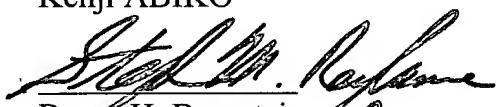
Therefore, even assuming, arguendo, that these inventions can be properly brought together and considered, it is impossible to conceive the technical idea of the present invention for obtaining an Fe-Cr base alloy having excellent strength-ductility balance at super-high temperature of not less than 1000 °C by adding Cr of not less than 60% and

further controlling C, N, S, O and O as an oxide to an extremely small amount by those skilled in the art.

CONCLUSION

In view of the foregoing, it is believed that all of the claims in this application are in condition for allowance, which action is respectfully requested. If any issues yet remain which can be resolved by a telephone conference, the Examiner is respectfully invited to telephone the undersigned at the telephone number below.

Respectfully submitted.
Kenji ABIKO



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